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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/594,756	09/29/2006	Kazuyoshi Inoue	ITO-0003	4694
23599 7590 08/05/2010 MILLEN, WHITE, ZELANO & BRANIGAN, P.C. 2200 CLARENDON BLVD. SUITE 1400 ARLINGTON, VA 22201				
EXAMINER				
BAND, MICHAEL A				
ART UNIT		PAPER NUMBER		
1795				
NOTIFICATION DATE		DELIVERY MODE		
08/05/2010		ELECTRONIC		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docketing@mwzb.com

**Office Action Summary****Application No.**

10/594,756

**Applicant(s)**

INOUE ET AL.

**Examiner**

MICHAEL BAND

**Art Unit**

1795

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 02 July 2010.  
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-4 and 6-9 is/are pending in the application.  
4a) Of the above claim(s) 6-9 is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1-4 is/are rejected.  
7) ☒ Claim(s) 6-9 is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☒ The drawing(s) filed on 29 September 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☐ Information Disclosure Statement(s) (PTO/SB-06)  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date: \_\_\_\_\_  
5) ☐ Notice of Informal Patent Application  
6) ☐ Other: \_\_\_\_\_  
Paper No(s)/Mail Date: \_\_\_\_\_

## DETAILED ACTION

### *Claim Objections*

1. Claims 6-9 are objected to because of having the wrong status identifiers; claims 6-9 should be identified as "withdrawn – previously presented" or "withdrawn – original". Appropriate correction is required.

### *Claim Rejections - 35 USC § 112*

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 1-4 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claim 1 requires the abundance of trivalent cerium  $[\text{Ce}^{+3}]/([\text{Ce}^{+3}]+[\text{Ce}^{+4}])$  is 0.01 to 0.6. There is no support in the Specification or Drawings for the expression  $[\text{Ce}^{+3}]/([\text{Ce}^{+3}]+[\text{Ce}^{+4}])$  to determine the abundance of trivalent cerium. Regarding Applicant pointing to para 0062 of the Specification for support, it is noted that there is support for the expression to determine the abundance of trivalent cerium results in the value 0.15, and not the range as claimed. Claim 4 requires the expression

$[Ce]/([In]+[Ce]) = 0.005$  to  $0.035$ . There is no support in the Specification or Drawings for this claimed range.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fukuyoshi et al (JP No. 09176841) as applied to claim 1 above, and further in view of Hosokawa et al (WO 2004/017137), equivalent to Hosokawa et al (USPGPub 2006/0049410).

With respect to claims 1-2, Fukuyoshi et al discloses a sputtering target comprising mixed oxides of cerium oxide and indium oxide (abstract), where the particle diameter of each oxide incorporated into the target is  $2\text{ }\mu\text{m}$  or less (para 0043-0044). Despite Fukuyoshi et al not specifying how the diameter of the particle is observed and measured, it is either inherent or obvious that any type of observing and measuring technique, including the claimed techniques, can be used since the particle diameter is a constant value that is not altered nor dependent by observing and measuring techniques. However Fukuyoshi et al is limited in that while the cerium oxide is  $\text{CeO}_2$ , and thus is a positive quadravalent, it is not suggested for said cerium oxide to be  $\text{Ce}_2\text{O}_3$ , and thus being a positive trivalent.

Hosokawa et al teaches an inorganic (i.e. conductive) film formed via sputtering, and thus, from a sputtering target (p. 1, para 0013-0016; p. 2, para 0032-0039; p. 4, para 0090). Since the inorganic film is formed via sputtering, it is obvious that the sputtering target used to deposit said inorganic film comprises the components of said inorganic film. Hosokawa et al further teaches the inorganic film comprises one or more metals from Group A comprising In, Sn, Ga, Si, Ge, Zn, Cd, Mg, Al, Ta, and Ti and one or more metals from Group C comprising Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, and Lu, where the compounds are oxides (p. 2, para 0032-0034, 0036). Hosokawa et al also teaches specific examples of the Group A compound as  $\text{In}_2\text{O}_3$  and the Group B compound as  $\text{Ce}_2\text{O}_3$  or  $\text{CeO}_2$  (p. 3, para 0072, 0083).

Since the prior art of Hosokawa et al recognizes the equivalency of  $\text{Ce}_2\text{O}_3$  and  $\text{CeO}_2$  in the composition of sputter targets used to deposit conductive films, it would have been obvious to one of ordinary skill in the art to replace  $\text{CeO}_2$  of Fukuyoshi et al with the  $\text{Ce}_2\text{O}_3$  of Hosokawa et al as it is merely the selection of functionally equivalent cerium oxides recognized in the art and one of ordinary skill would have a reasonable expectation of success in doing so.

The combination of the references Fukuyoshi et al and Hosokawa et al teach a sputter target comprising a majority  $\text{In}_2\text{O}_3$  and a mixture of  $\text{Ce}_2\text{O}_3$  (trivalent) and  $\text{CeO}_2$  (tetravalent). It is well known and inherent that  $\text{CeO}_2$  is the most common and stable form, with the properties of redox chemistry involving concentrations of  $\text{Ce}^{+4}/\text{Ce}^{+3}$  dependent on the amount of oxygen present, as evidenced by Bhosale (*Effective utilization of spray pyrolyzed  $\text{CeO}_2$  as optically passive counter electrode for enhancing*

*optical modulation of WO<sub>3</sub>*, Introduction; [www.webelements.com](http://www.webelements.com), cerium; [www.wikipedia.com](http://www.wikipedia.com), cerium oxide referenced by *Handbook of Inorganic Chemicals*).

Therefore the abundance of trivalent cerium present in the sputtering target is a result-effective variable dependent on the amount of oxygen present, with it being held that a particular parameter must first be recognized as a result-effective variable, i.e. a variable which achieves a recognized result, before determination of the optimum or workable ranges of said variable might be characterized as routine experimentation. See MPEP 2144.05, Section II, Part B. Therefore one of ordinary skill would find it obvious that by varying the oxygen concentration results in different concentrations, including the claimed concentration, of trivalent cerium.

With respect to claim 3, modified Fukuyoshi et al further discloses the sputter target comprising indium oxide and cerium oxide in addition to smaller quantities of tin oxide and titanium oxide (para 0027), where tin oxide has a concentration of 0.1at% to 5at%, titanium oxide has a concentration of 0.1at% to 5at%, and cerium oxide has a concentration of 5at% to 60at% (para 0019, 0025, 0032). Taking the minimum amount of combined concentrations of tin, titanium, and cerium (i.e. 0.1at%, 0.1at%, 5at%, respectively) results in a balance of indium oxide 94.8at%, resulting in  $[5at\%]/[94.8\%]+[5at\%]$  equals approximately 0.05. It has been held that a prima facie case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. See MPEP 2145.05, Section I. In addition it has been held that differences in concentration will not support patentability of subject matter

encompassed by the prior art unless there is evidence indicating such concentration is critical. See MPEP 2145.05, Section II, Part A. Therefore it would be obvious to one of ordinary skill to use a slightly smaller concentration of cerium oxide, resulting in the claimed range, since one of ordinary skill would expect the sputter target to have the same properties.

With respect to claim 4, modified Fukuyoshi et al further discloses the density of the indium oxide and cerium oxide sputter target is  $6.9 \text{ g/cm}^3$  and a resistance of  $2 \times 10^{-2} \Omega\text{cm}$  (para 0057, 0061).

### ***Response to Arguments***

#### **Restriction Requirement**

6. The Applicant's argument to the Restriction Requirement has already been addressed in the Non-Final office action dated 3/2/2010.

#### **112 Rejections**

7. The Applicant has amended claim 4 to require a density with units; the rejection is withdrawn.

#### **103 Rejections**

8. Applicant's arguments with respect to claims 1-4 have been considered but are moot in view of the ground(s) of rejection due to the new claim limitation requiring the

abundance of trivalent cerium  $[Ce^{+3}]/([Ce^{+3}]+[Ce^{+4}])$  is 0.01 to 0.6 which has been addressed in the rejections above.

### ***Conclusion***

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Band whose telephone number is (571) 272-9815. The examiner can normally be reached on Mon-Fri, 9am-5pm, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on (571) 272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



Art Unit: 1795

10. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/M. B./

Examiner, Art Unit 1795

/Ula C Ruddock/

Supervisory Patent Examiner, Art Unit 1786